ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme June 2003

GCE

Biology / Human Biology A

Unit BYA1

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BYA 1

Question 1

(a)		Out pulmonary artery and returning pulmonary vein; Via lungs;	2
(b)	(i)	Thinner/(bi)concave/less cytoplasm/haemoglobin;	1
	(ii)	Section X-X showing biconcave appearance; Section Y-Y ovoid shape;	2
(c)	(i)	Both with plasma membrane/cell membrane/cytoplasm; [*Reject: no cell wall or absence of other features*]	1
	(ii)	Have no cell wall/capsule/flagellum/mesosomes/loop of DNA/plasmids/ ribosomes/organelles;	1

Total 7 marks

Question 2

(a)	(i)	Less/no protein at Y; (Molecule) too large;	2
	(ii)	More concentrated; Water removed;	2
(b)		Produces lower water potential; Water moves into capillary; By osmosis/diffusion;	3
(c)		Starvation linked to low protein content of diet/Low protein concentration in plasma/blood; Water potential of blood higher/smaller water potential gradient; Tissue fluid formed faster than returned/less tissue fluid returned to blood;	max 2

Total 9 marks

Question 3

(a)		Diaphragm/intercostal muscles contract; Increases volume of thorax/chest/lungs; Negative/lower pressure in lungs; [*Ignore: references to internal and external intercostal muscles*]	3
(b)	(i)	Allows stabilisation/becomes steady/adapts;	1
	(ii)	41.7 (dm^3/litres);	1
	(iii)	Tidal volume increases steadily then levels out; Breathing rate changes little until highest exercise rate/180 reached then increases; [*Note: Consider giving credit to answers where a specific part of the range is defined and described accurately*]	2

Total 7 marks

Question 4

(a)	(i)	Higher pressure in ventricle;	1
	(ii)	Diagram showing closed valve drawn in appropriate position;	1
(b)		Allows blood to leave atria/pass into ventricle; Before ventricle contracts/empties;	2
(c)		Impulses; Along parasympathetic/vagus; OR Fewer impulses; Along sympathetic/(cardiac)accelerator; Slows activity from SAN/pacemaker; [*Reject: decelerator nerve*]	3

Total 7 marks

Question 5

(a)	(i)	Line over bottom of paper but below origin;	1
	(ii)	Repeat and allow to dry in between;	1
(b)		Turn paper through 90^o/two-way chromatography; Use different solvent;	2
(c)	(i)	0.8 - 0.84;	1
	(ii)	Made up of two monosaccharides/two of the monosaccharides are the same;	1
(d)		16; Three hexoses gives 18 oxygen atoms/hexose has 6 oxygen atoms; Two lost; In condensation/with removal of water;	max 3

Total 9 marks

Question 6

(a) Made up of tissues; 1

(b) Diffusion;
From (blood in) vessels in wall; 2

(c) (i) Recoil;
Of elastic tissue; 2
[*Note: Do not allow second point where included with other tissues*]

(ii) Each surge in pressure caused by one contraction/heart beat; 1

Total 6 marks

Question 7

(a) (Banana + Benedict's solution) and heat;
More reducing sugar produces redder colour/more precipitate/
description of relative colour change/turns red quicker;
Standardise test/Same amount of banana and Benedict's solution; 3

(b) More sugar/solute/soluble substances present;
So concentration of water lower/less free water molecules; 2
[*Accept: decreases solute potential*]

(c) (i) Process controlled by enzymes;
Low temperature/cold means less (kinetic) energy;
Fewer collisions/enzyme-substrate complexes formed; 3

(ii) Chilling caused by time and temperature so if time long, temperature must be higher; 1

(d)

Starch	1	Coiled molecule;
	2	Large quantity can be stored in small space/compact for storage;
	3	Insoluble;
	4	Not "washed" from cells/no osmotic effect;
	5	Branched;
	6	Easily broken down;
	7	For respiration;
Cellulose	8	Straight chains;
	9	Hydrogen bonds between chains;
	10	Forms fibres;
	11	Provides strength to cell wall;

max 6

[*Note: Maximum 4 marks for either substance*]

Total 15 marks

Question 8

(a)	(i)	Other (membrane bound) organelles/nucleus not included;		1
	(ii)	Folded inner membrane/Inner membrane forms cristae;		1
(b)	(i)	650;		1
	(ii)	Microvilli;		1
(c)	(i)	More mitochondrial membrane; Mitochondria produce ATP/release/transfer energy; From respiration; To move substances against concentration gradient; [*Note: Do not credit "make" or "produce" energy for second point*]	max	2
	(ii)	Large amount of rough endoplasmic reticulum; On which ribosomes are found; Enzymes are proteins; Protein synthesis/translation on ribosomes/rough er;	max	3
(d)		1 Phosholipid consists of glycerol; 2 (To which are joined) two fatty acids; 3 And phosphate; 4 By condensation/elimination of water molecules; 5 Arranged as bilayer in membrane; 6 Head/phosphate hydrophilic/polar and tail/fatty acid hydrophobic/non-polar; 7 Heads outside and tails attracted to each other/inside;	max	6

Total 15 marks